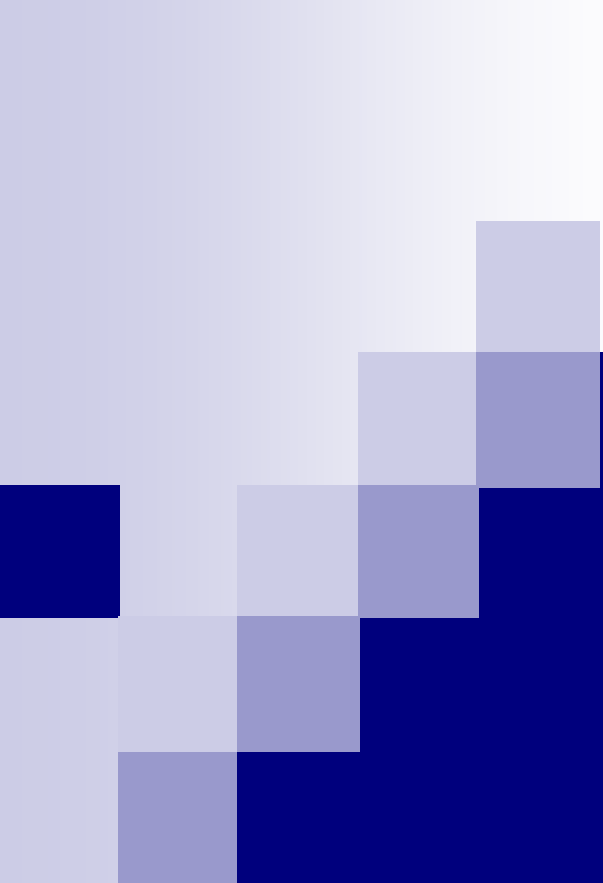


US EPA ARCHIVE DOCUMENT



Residential modifications and physical decline among community-dwelling elderly: Results of a survey-weighted propensity model

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Purpose of the study

- To quantify the extent residential modification reduce the risk of subsequent decline in older adults

Background

- Residential modifications has been associated with:
 - decreased likelihood of entering a nursing home (Newman et al., 1990)
 - decreased need for bathing personal care among frail older adults (Gitlin et al., 1999)
 - decreased functional decline as part of a comprehensive intervention (Mann et al., 1999)



Background

- Environmental modifications and personal assistive devices can prevent disability by reducing task demand (Verbrugge et al., 2002).
- The effect of residential modifications alone has not been well-studied (Newman, 2003).



Methodology

- Data: Second Longitudinal Study on Aging (LSOA II)
 - National probability sample of community-dwelling adults 70+ in 1994-1995
 - Follow-up conducted in 1997-98
 - n=9,447, weighted n= 21 million

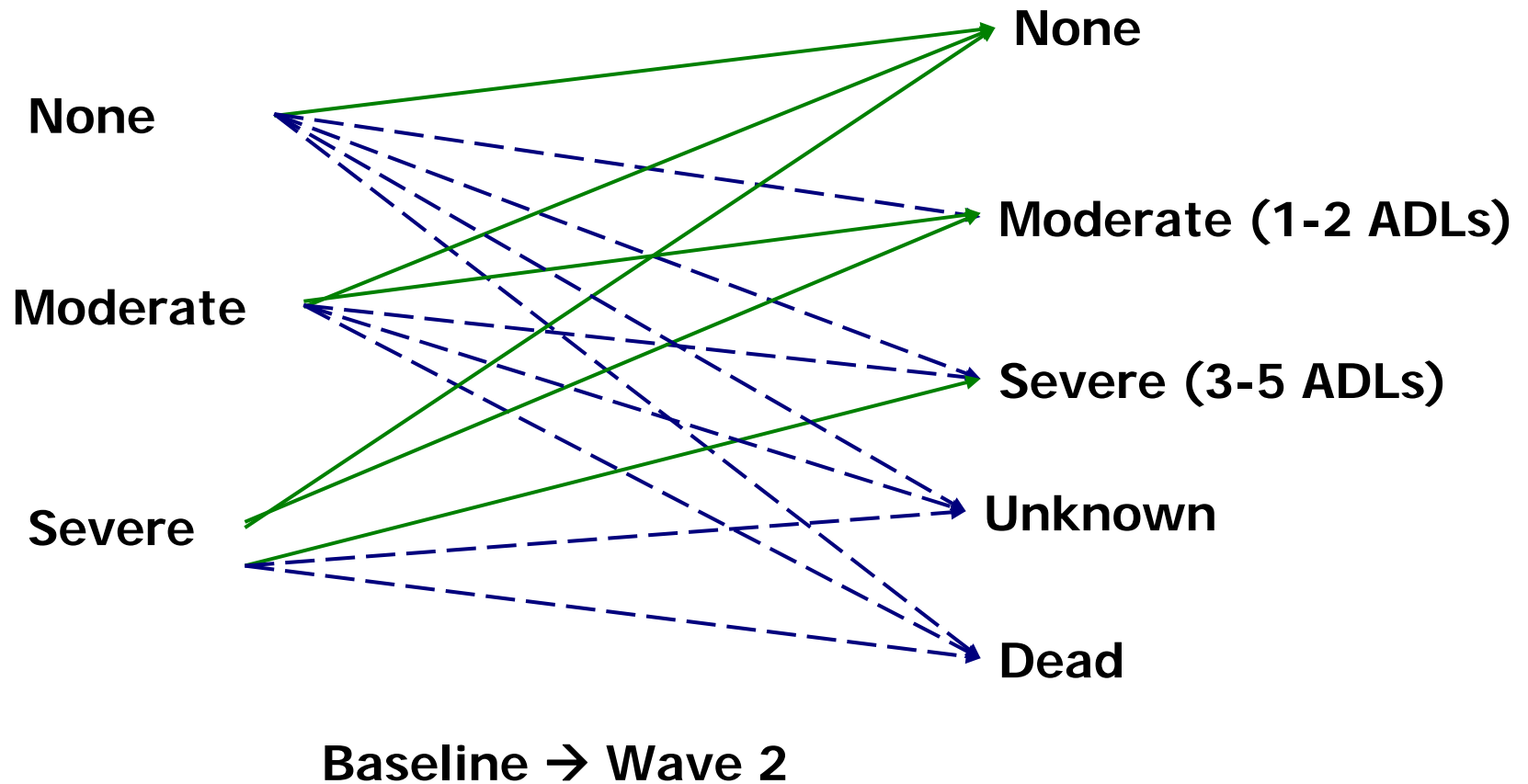


Measures - determinant

■ Residential modification at baseline

- Ramps or street level entrance, railings, automatic/ easy doors, have bathroom modifications, kitchen modifications, elevator or lift, alerting devices, and other special features

Measures - Outcome



- Decline in physical function at follow-up (Yes/ No)



Methodology

■ Propensity score

- Technique that adjusts for baseline differences in those with and without residential modifications.
- We included thirty two sociodemographic, health, behavioral, service utilization and geographical characteristics strongly associated with decline or baseline modification in our propensity score model.



Methodology

■ Propensity score

- Divided into five strata of equal sizes
- Evaluated the extent to which balance of the distribution of potential confounders for having residential modifications were similar within each strata using graphs and tables
- Estimated risk difference within each quintile
- Estimated the overall effect as a weighted average

Results

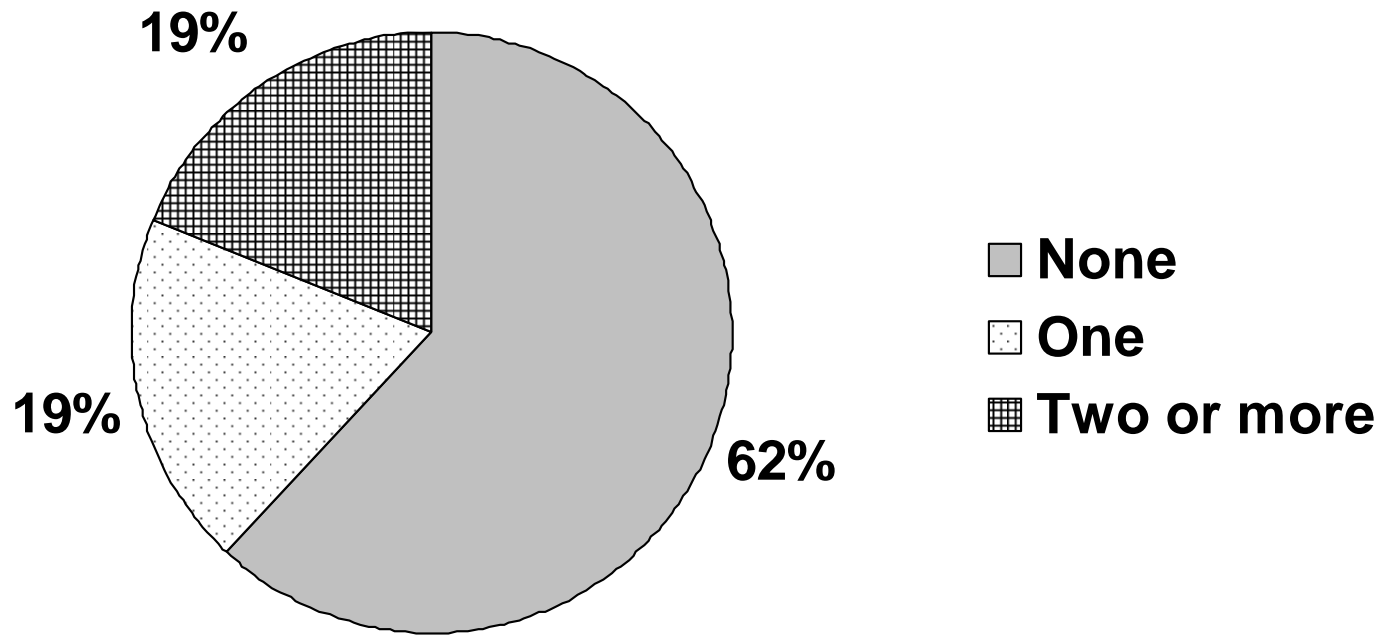


Figure 1: Proportion of community-dwelling older adults in the US with a residential modification at baseline, LSOA II 1994-1995

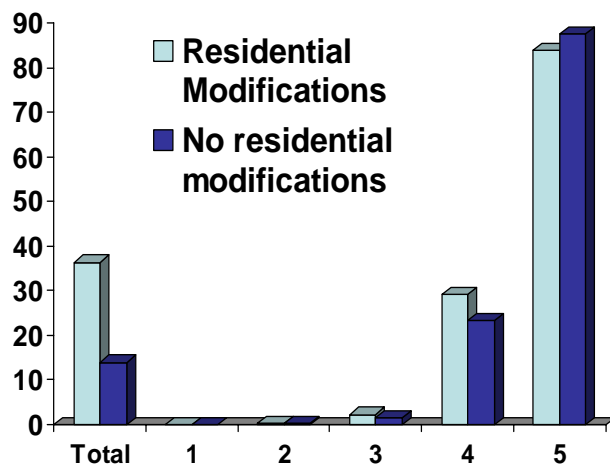
Results

Table 1: Comparison of participant characteristics by presence of baseline residential modifications, LSOA II

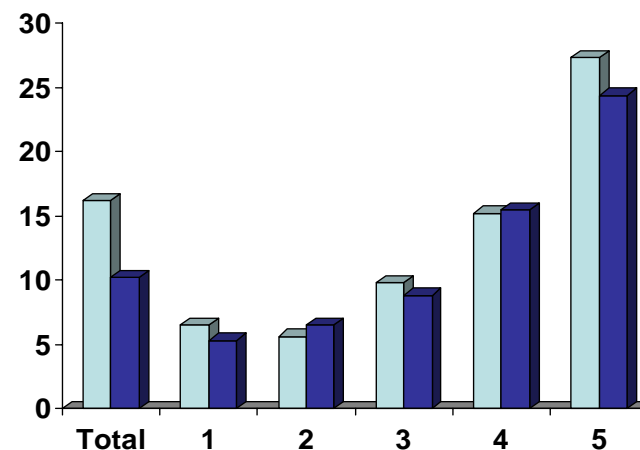
Characteristics	Baseline Modifications	
	Yes	No
Sample n	3,582	5,865
Weighted n	8,198,233	13,557,616
70-74 years old	34%	43%
Male	36%	42%
Married	49%	56%
White	91%	89%
Lives alone	40%	31%
Excellent/ Very Good Health	33%	40%
Frequently depressed/ anxious	10%	6%
Home healthcare services in the past 12 months	5%	1%
Uses special aides	36%	14%
Has a regular exercise routine	37%	40%

Figure 2. Balance achieved with propensity score, LSOA II

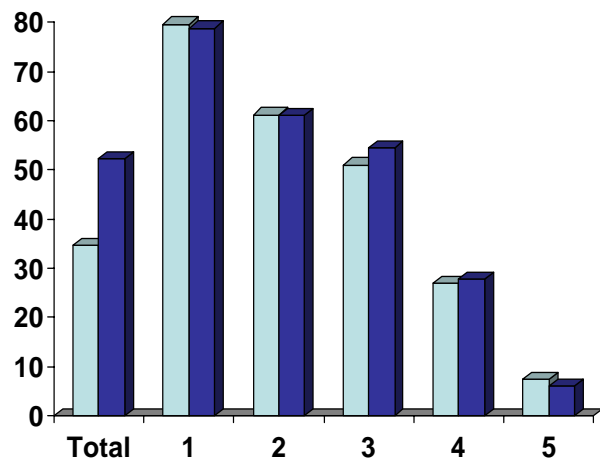
Panel A: % Uses special aides



Panel B: % 85 and older



Panel C: % No lower body limitations



Panel D: % Excellent or very good health

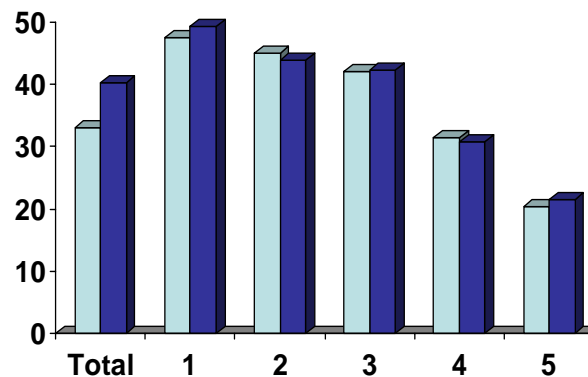


Table 2: Effect of residential modifications on decline in risk for physical functional decline in 2 years, LSOA II

Model	% with modifications	Has residential modification	% with decline	Risk difference
<i>Crude</i>	38	Yes	44.1	
		No	43.7	-0.4
<i>Propensity score</i>				
Quintile 1	19	Yes	39.4	
		No	41.2	1.8
Quintile 2	28	Yes	36.2	
		No	39.0	2.8
Quintile 3	33	Yes	39.1	
		No	41.7	2.6
Quintile 4	43	Yes	44.4	
		No	49.5	5.1
Quintile 5	67	Yes	50.6	
		No	53.1	2.5
Overall	38	Yes	41.9	
		No	44.9	3.0
<i>Overall survey-weighted propensity-score model</i>		Yes	43.9	
		No	47.0	3.1

Results

- The proportion of participants with baseline modifications varied greatly according to quintile (range =19 - 67%).
- Within each quintile, presence of residential modifications at baseline was associated with a reduction in risk of physical decline in two years (Range for risk difference = 2-5%).
- Overall survey-weighted risk difference of 3.1%



Limitations

- Self-reports
- Assumes presence of modification indicates correct usage
- May not have accounted for all possible confounders in our propensity score model
- Amount of time between data collection points
- Data collected in the 1990s



Conclusion

- The range of effect according to quintile in our propensity score model suggest the benefit of having residential modifications may differ according to subgroup.
- Our results suggest having residential modifications may be associated with a modest reduction in risk of decline among older community-dwelling adults.



Directions for future research

- More research is needed to examine the effects of individual types of modification.
- Identify subgroups that may benefit most from having a residential modification.